



09-02-03

PATENT  
Attorney Docket No. 010500DIV2

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: : Polythiophenes, Block Copolymers  
McCullough et al. : Made Therefrom, and Methods of  
: Forming the Same  
Serial No.: 10/634,035 : Group No.: Not Yet Assigned  
Filed: August 4, 2003 :  
:

INFORMATION DISCLOSURE STATEMENT

Pittsburgh, Pennsylvania 15222  
August 29, 2003

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

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Applicants note that although the cited references may be relevant to the examination of the above-referenced application, under 37 C.F.R. § 1.97(h), the filing of this *Information Disclosure Statement* "shall not be construed to be an admission that the information cited in the statement is, or is considered to be, material to patentability as defined in § 1.56(b)."

Respectfully submitted,



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PTO/SB/08A (10-01)

Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

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Substitute for form 1449A/PTO				<i>Complete if Known</i>	
				Application Number	10/634,035
				Filing Date	August 4, 2003
				First Named Inventor	Richard D. McCullough
				Art Unit	Not Yet Assigned
				Examiner Name	Not Yet Assigned
(use as many sheets as necessary)					
Sheet	1	of	3	Attorney Docket Number	010500DIV2

**U.S. PATENT DOCUMENTS**

Examiner Initials*	Cite No. <sup>1</sup>	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number - Kind Code <sup>2</sup> (if known)			
		4,508,639	04/02/1985	Camps et al.	
		4,521,589	06/04/1985	Yamamoto et al.	
		4,929,388	05/29/1990	Wessling	
		4,935,164	06/19/1990	Wessling et al.	
		5,028,354	07/02/1991	Smith et al.	
		5,217,649	06/08/1993	Kulkarni et al.	
		5,281,363	01/25/1994	Shacklette et al.	
		5,358,546	10/25/1994	Rieke	
		5,391,622	02/21/1995	Ho et al.	
		5,427,855	06/27/1995	Heeger et al.	
		5,476,612	12/19/1995	Wessling et al.	
		5,571,454	11/05/1996	Chen et al.	
		5,756,653	05/26/1998	Rieke	
		6,025,462	02/15/2000	Wang et al.	
		6,166,172	12/26/2000	McCullough et al.	
		6,190,846	02/20/2001	Majumdar et al.	

**FOREIGN PATENT DOCUMENTS**

Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T <sup>6</sup>
		Country Code <sup>3</sup> -Number <sup>4</sup> -Kind Code <sup>5</sup> (if known)				

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				Art Unit	Not Yet Assigned	
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Sheet 2		of 3	Attorney Docket Number 010500DIV2			
<b>OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS</b>						
Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published				T <sup>2</sup>
		McCullough, "The Chemistry of Conducting Polythiophenes", <i>Advanced Materials</i> , Vol. 10, No. 2, pp. 93-116 (1999)				
		Guillerez et al. "New Convenient Synthesis of Highly Regioregular Poly(3-octylthiophene)Based on the Suzuki Coupling Reaction", <i>Synthetic Metals</i> , Vol. 93, pp. 123-126 (1998)				
		Iraqi et al., "Synthesis and Characterisation of Telechelic Regioregular Head-to-Tail Poly(3-Alkylthiophenes)", <i>Mater. Chem.</i> , Vol. 8, No. 1, pp. 25-29 (1998)				
		Shirakawa et al., "Cross-Coupling Reaction of Organostannanes with Aryl Halides Catalyzed by Nickel-Triphenylphosphine or Nickel-Lithium Halide Complex", <i>Synthesis</i> , pp. 1544-1549 (October 1998)				
		Boymond et al., "Preparation of Highly Functionalized Grignard Reagents by an Iodine-Magnesium Exchange Reaction and its Application in Solid-Phase Synthesis", <i>Agnew Chem. Int. Ed.</i> , Vol. 37, No. 12, pp. 1701-1703 (1998)				
		Bao et al., "Soluble and Processable Regioregular Poly(3-hexylthiophene) for Thin Film Field-Effect Transistor Applications with High Mobility", <i>Appl. Phys. Lett.</i> , Vol. 69 (26), pp. 4108-4110 (1995)				
		Chen et al., "Regiocontrolled Synthesis of Poly(3-alkylthiophenes) Mediated by Rieke Zinc: Their Characterization and Solid-State Properties", <i>J. Am. Chem. Soc.</i> , Vol. 117, pp. 233-244 (1995)				
		Mao et al., "Synthesis and Structure-Property Relationships of Regioirregular Poly(3-hexylthiophenes)", <i>Macromolecules</i> , Vol. 26, pp. 1163-1169 (1993)				
		McCullough et al., "Design, Synthesis, and Control of Conducting Polymer Architectures: Structurally Homogeneous Poly(3-alkylthiophenes)", <i>J. Org. Chem.</i>				
		Farina et al., "Palladium-Catalyzed Coupling of Arylstannanes with Organic Sulfonates: A Comprehensive Study", <i>J. Org. Chem.</i> , Vol. 58, pp. 5434-5444 (1993)				
		Yamamoto et al., "Preparation of $\pi$ -Conjugated Poly(thiophene-2,5-diyl), Poly( <i>p</i> -phenylene), and Related Polymers Using Zerovalent Nickel Complexes. Linear Structure and Properties of the $\pi$ -Conjugated Polymers", <i>Macromolecules</i> , Vol. 25, pp. 1214-1223 (1992)				
Examiner Signature				Date Considered		



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<p>Art Unit</p>		<p>Not Yet Assigned</p>			
<p>Examiner Name</p>		<p>Not Yet Assigned</p>			

## OTHER PRIOR ART OR NON-PATENT LITERATURE DOCUMENTS

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